GEPHE SUMMARY

Gephebase Gene
RPP5 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^RPP5^#gephebase-summary-title)

GepheID
GP00001009

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=^Pathogen resistance^#gephebase-summary-title)

Trait State in Taxon A
Arabidopsis thaliana- Col0 - resistant

Trait State in Taxon B
Arabidopsis thaliana- Ler-0 - resistant

Ancestral State
Data not curated

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Arabidopsis thaliana- Col0 - resistant

Taxon B

Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Arabidopsis thaliana- Ler-0 - resistant

GENOTYPIC CHANGE

Generic Gene Name
RPP5

Synonyms
DISEASE RESISTANCE PROTEIN RPP5; DL4505C; FCAALL.315; RECOGNITION OF PERONOSPORA PARASITICA 5; At4g16950; dl4505c

String
3702.AT4G16950.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT4G16950.1)

Sequence Similarities
-

GO - Molecular Function
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0000166 : nucleotide binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000166)
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)

UniProtKB Arabidopsis thaliana
F4JNB7 (http://www.uniprot.org/uniprot/F4JNB7)

GenebankID or UniProtKB
AK226966 (https://www.ncbi.nlm.nih.gov/nuccore/AK226966)

GO - Biological Process

GO:0006952 : defense response (https://www.ebi.ac.uk/QuickGO/term/GO:0006952)
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)
GO:0009817 : defense response to fungus, incompatible interaction (https://www.ebi.ac.uk/QuickGO/term/GO:0009817)

GO - Cellular Component

-

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

Gene Amplification (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Gene Amplification^#gephebase-summary-title)

Aberration Type

Complex Change (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Complex Change^#gephebase-summary-title)

Molecular Details of the Mutation

Partial duplication sufficient to increase resistance

Experimental Evidence

Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephebase-summary-title)

Main Reference

The Arabidopsis downy mildew resistance gene RPP5 shares similarity to the toll and interleukin-1 receptors with N and L6. (1997) (https://pubmed.ncbi.nlm.nih.gov/9212464)

Authors

Parker JE; Coleman MJ; SzabÃ² V; Frost LN; Schmidt R; van der Biezen EA; Moores T; Dean C; Daniels MJ; Jones JD

Abstract

Plant disease resistance genes operate at the earliest steps of pathogen perception. The Arabidopsis RPP5 gene specifying resistance to the downy mildew pathogen Peronospora parasitica was positionally cloned. It encodes a protein that possesses a putative nucleotide binding site and leucine-rich repeats, and its product exhibits striking structural similarity to the plant resistance gene products N and L6. Like N and L6, the RPP5 N-terminal domain resembles the cytoplasmic domains of the Drosophila Toll and mammalian interleukin-1 transmembrane receptors. In contrast to N and L6, which produce predicted truncated products by alternative splicing, RPP5 appears to express only a single transcript corresponding to the full-length protein. However, a truncated form structurally similar to those of N and L6 is encoded by one or more other members of the RPP5 gene family that are tightly clustered on chromosome 4. The organization of repeated units within the leucine-rich repeats encoded by the wild-type RPP5 gene and an RPP5 mutant allele provides molecular evidence for the heightened capacity of this domain to evolve novel configurations and potentially new disease resistance specificities.

Additional References

Genome-wide survey of Arabidopsis natural variation in downy mildew resistance using combined association and linkage mapping. (2010) (https://pubmed.ncbi.nlm.nih.gov/20479233)

RELATED GEPHE

Related Genes

20 (ACD6 = ACCELERATED CELL DEATH 6, ERECTA, RAC1, Resistance related Kinase 1 (RKS1), RLM1, RLM2 cluster, RLM3, RPM1, RPP1-WsA, RPP1-WsB, RPP1-WsC, RPP13, RPP2A-RPP2B, RPP4, RPP8, RPS2, RPS4, RPS5, RRS1, WRR4) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^RPP5^/and+Taxon ID=^3702^/or+Gene Gephebase=^RPP5^/and+Taxon ID=^3702^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS